

Claims

1. A nucleic acid sequence coding for the Japanese cedar pollen allergen *Cry j I*, or at least one antigenic fragment thereof or the functional equivalent of said nucleic acid sequence.

2. The nucleic acid sequence of claim 1 wherein said nucleic acid sequence has the nucleotide sequence of bases 67 through 1187 of SEQ ID NO: 1.

3. A nucleic acid sequence of claim 1 wherein said nucleic acid sequence consists essentially of at least one fragment of the coding portion of the nucleic acid sequence of SEQ ID NO: 1.

4. An expression vector comprising a nucleic acid sequence coding for the Japanese cedar pollen allergen *Cry j I*, or at least one antigenic fragment thereof.

5. The expression vector of claim 4 wherein said nucleic acid sequence has the nucleotide sequence of bases 67 through 1187 of SEQ ID NO: 1.

6. The expression vector of claim 4 wherein said nucleic acid sequence consists essentially of at least one fragment of the coding portion of the nucleic acid sequence of SEQ ID NO: 1.

7. A host cell transformed to express a protein or peptide encoded by the nucleic acid sequence of claim 1.

8. A host cell transformed to express a protein encoded by the nucleic acid sequence of claim 2.

9. A host cell transformed to express a protein encoded by the nucleic acid sequence of claim 3.

10. Purified Japanese cedar pollen allergen *Cry j I* or at least one antigenic fragment thereof produced in a host cell transformed with the nucleic acid sequence of claim 1.

11. Purified Japanese cedar pollen allergen *Cry j I* produced in a host cell transformed with the nucleic acid sequence of claim 2.

12. At least one fragment of purified Japanese cedar pollen allergen *Cry j I* produced in a host cell

transformed with the nucleic acid sequence of claim 3.

13. A method of producing Japanese cedar pollen allergen *Cry j I* or at least one fragment thereof comprising,
culturing a host cell transformed with a DNA
5 sequence encoding Japanese cedar pollen allergen *Cry j I* or
fragment thereof in an appropriate medium to produce a mixture
of cells and medium containing said Japanese cedar pollen
allergen *Cry j I* or at least one fragment thereof; and
purifying said mixture to produce substantially pure
10 Japanese cedar pollen allergen *Cry j I*, or at least one
fragment thereof.

14. A protein preparation comprising Japanese cedar pollen allergen *Cry j I*, or at least one fragment thereof synthesized in a host cell transformed with a DNA sequence
15 encoding all or a portion of Japanese cedar pollen allergen *Cry j I*.

15. The protein preparation of claim 14 wherein
said at least one fragment of *Cry j I* is an antigenic
fragment.

20 16. A protein preparation comprising chemically
synthesized Japanese cedar pollen allergen *Cry j I* or at least
one fragment thereof.

17. The protein preparation of claim 14 wherein
said *Cry j I* has the amino acid sequence of SEQ ID NO: 1.

25 18. The protein preparation of claim 16 wherein
said *Cry j I* has the amino acid sequence of SEQ ID NO: 1.

19. An isolated antigenic fragment of an allergen
from Japanese cedar pollen.

20. The antigenic fragment of claim 19 wherein
30 said allergen from Japanese cedar pollen is *Cry j I*.

21. The antigenic fragment of claim 19 wherein
said antigenic fragment has T-cell stimulating activity.

22. The antigenic fragment of claim 20 wherein
said antigenic fragment has T-cell stimulating activity.

35 23. The antigenic fragment of claim 22 wherein
said antigenic fragment further has minimal immunoglobulin E
stimulating activity.

24. The antigenic fragment of claim 22 wherein said antigenic fragment does not bind immunoglobulin E specific for Japanese cedar pollen.

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O 25. The antigenic fragment of claim 19 wherein said antigenic fragment is capable of modifying, in a Japanese cedar pollen-sensitive individual to which it is administered, the allergic response to Japanese cedar pollen.

10 26. The antigenic fragment of claim 20 wherein said antigenic fragment is capable of modifying, in a Japanese cedar pollen-sensitive individual to which it is administered, the allergic response to Japanese cedar pollen.

15 27. The antigenic fragment of claim 25 wherein said antigenic fragment is capable of modifying B-cell response of the individual to a Japanese cedar pollen allergen, T-cell response of the individual to a Japanese cedar pollen antigen, or both.

20 28. The antigenic fragment of claim 26 wherein said antigenic fragment is capable of modifying B-cell response of the individual to a Japanese cedar pollen allergen, T-cell response of the individual to a Japanese cedar pollen antigen, or both.

25 29. A nucleic acid sequence coding for the isolated antigenic fragment of Japanese cedar pollen allergen of claim 19.

30 30. A modified Japanese cedar pollen protein allergen which, when administered to a Japanese cedar pollen-sensitive individual, reduces the allergic response of the individual to Japanese cedar pollen.

35 31. The modified cedar pollen protein allergen of claim 30 wherein said modified cedar pollen protein allergen is a modified *Cry j I* protein.

32. At least one modified fragment of Japanese cedar pollen protein allergen which, when administered to a Japanese cedar pollen-sensitive individual, reduces the allergic response of the individual to Japanese cedar pollen.

33. At least one modified fragment of claim 32 wherein said modified fragment or fragments is a modified

fragment of *Cry j I* protein.

34. An isolated protein allergen or antigenic fragment thereof that is immunologically related to *Cry j I* or fragment thereof.

5 35. The isolated protein allergen or fragment thereof of claim 34 wherein said protein allergen or antigenic fragment thereof is immunologically cross-reactive with antibodies specific for *Cry j I* or fragment thereof.

10 36. A therapeutic composition comprising purified Japanese cedar pollen allergen *Cry j I* or at least one fragment thereof and a pharmaceutically acceptable carrier or diluent.

15 37. The therapeutic composition of claim 36 wherein *Cry j I* has the sequence of amino acids 1-353 of SEQ ID NO: 1.

38. A method of treating sensitivity to Japanese cedar pollen in a mammal sensitive to such pollen, comprising administering to said mammal a therapeutically effective amount of the Japanese cedar pollen allergen of claim 14.

20 39. A method of treating sensitivity to Japanese cedar pollen in a mammal sensitive to such pollen, comprising administering to said mammal a therapeutically effective amount of the Japanese cedar pollen allergen of claim 16.

40. A method of detecting in a mammal sensitivity to a Japanese cedar pollen allergen comprising combining a blood sample obtained from said mammal with an isolated Japanese cedar pollen protein allergen or antigenic fragment thereof produced in a host cell transformed with the nucleic acid sequence of claim 1 or chemically synthesized under 25 conditions appropriate for binding of blood components with the protein or fragment thereof and determining the extent to which such binding occurs.

35 41. The method of claim 40 wherein the extent to which binding occurs is determined by assessing T cell function, T cell proliferation, B cell function, binding of the protein or fragment thereof to antibodies present in the blood or a combination thereof.

A 42. A method of designing at least one fragment from a Japanese cedar pollen allergen ~~capable of modifying,~~ which modifies, in a Japanese cedar sensitive individual, an allergic response to said Japanese cedar pollen protein allergen, comprising
5 administering to the individual at least one fragment of a Japanese cedar pollen protein allergen, said fragment having an amino acid sequence recognized by a B-cell, or recognized by a T cell, and recognition of which by the B-cell or by the T-cell results, respectively, in down regulation of the B-
10 cell response or down regulation of the T cell response of said individual.

43. The method of claim 42 wherein said at least one fragment from Japanese cedar pollen allergen is a fragment of Cry j I.

15 44. A method of detecting sensitivity of a mammal to Japanese cedar pollen allergen comprising administering to said mammal a sufficient quantity of the Japanese cedar pollen allergen Cry j I or at least one antigenic fragment thereof produced in a host cell transformed with the nucleic acid sequence of claim 1 or chemically synthesized to provoke an allergic response in said mammal and determining the occurrence of an allergic response in the individual to said Japanese cedar pollen allergen.
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